



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/575,319

04/11/2006

Naoki Matsumura

14434.93USWO

3615

53148

7590

06/08/2009

HAMRE, SCHUMANN, MUELLER & LARSON P.C.

P.O. BOX 2902-0902

MINNEAPOLIS, MN 55402

EXAMINER

PATEL, SMITA S

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

06/08/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |   |  |
|------------------------------|--------------------------------------|---|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/575,319 | <b>Applicant(s)</b><br>MATSUMURA ET AL. |  |
|                              | <b>Examiner</b><br>SMITA PATEL       | <b>Art Unit</b><br>1793                 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. This application is in response to the application filed on April 11, 2006.
2. Claims 1-14 are pending.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Asanuma et al (US Patent No. 6,001,139) in view of Yoshiaki (JP 2001-135352, machine translation) and in further view of Harada et al (US Patent No.: 5,597,664).

**As per Claims 1 and 14,** Asanuma teaches the positive or negative electrode to be used is prepared by coating material mixture layer containing positive electrode active material or a negative electrode active material on a current collector. When the positive or negative electrode is in sheet like shape, it's desirable to arrange the material mixture layer on both sides of the current collector and the material mixture layer on one side may comprise a plurality layers. In addition to material mixture layer, electrode may also have protective layer undergoing in the current collector and intermediate layer to be arranged between material mixture layers. Positive electrode

Art Unit: 1793

current collector is prepared from stainless steel or aluminum and has net sheet, foil, lath or the like shape. Lithium containing transition metal oxide positive electrode active material is used, for example lithium cobalt oxide. Lithium is desirable as the light metal where metal forms alloy with lithium such as Aluminum, Al-Mg (Col.8 lines 54-67, Col.9 lines 1-67, Col.11 lines 13-16, Col.21 lines 3-5). Asanuma does not expressly mention collector containing other than alumina and average composition obtained by averaging the ratios of elements composing the collector in the direction of thickness of the collector is equal to a composition of an alloy whose liquidus temperature is 630° C or lower

Yoshiaki teaches non-aqueous electrolyte secondary battery comprising positive electrode containing lithium ions where in positive electrode includes active material such as lithium cobalt oxide or acetylene black or graphite. In addition, contains positive electrode collector body constituted of Al, Mg, and Si alloy and the shape can be sheet, a network, a film and etc. (abstract, paragraph 0004, 0011, 0014-0017, 0025). Yoshiaki teaches thickness of the composition is from 1-30 micrometers (equivalent 1-30 microns). Yoshiaki does not expressly mention average composition obtained by averaging the ratios of elements composing the collector in the direction of thickness of the collector is equal to a composition of an alloy whose liquidus temperature is 630° C or lower.

However, Harada teaches porous metal body is produced by forming coating film of one or more metal such as Al, Mg, Si, Ni, La, Li, Mn, Sn, Zn, Bi, Ca, Co, etc. capable of forming a eutectic alloy at temperatures not higher than the melting point of Al (melting

Art Unit: 1793

point temperature of Al is about 660° C, considered less than 660° C and overlaps with claimed range) on foamed resin skeleton having a three dimensional structure according to the plating, vapor deposition, sputtering, CVD or other vapor phases process (abstract, Col.4 lines 12-24). The thickness of the coating film is preferred to be not greater than 5 micron.

It would have been obvious to one of the ordinary skill in the art at the time of invention to combine the teaching of Asanuma containing plurality layers comprising of positive electrode active material on collector with teaching of Yoshiaki to obtain non-aqueous battery which have an excellent charge/discharge cycle characteristic, high charge and discharge capacities and reliability as taught by Yoshiaki. Further, it would have been obvious to one of the ordinary skill in the art at the time of invention to combine the method of Harada to include the temperature lower than that of melting point of Al with Asanuma and Yoshiaki teaching of non-aqueous electrolyte secondary battery to have an excellent oxidation and corrosion resistance and higher reliability as taught by Harada.

**As per Claim 2**, Yoshiaki teaches collector comprises a layer formed of an alloy Al and at least one element such as Mg and Si (abstract).

**As per Claims 3 and 5-6**, Yoshiaki teaches the positive electrode collector containing Al, Mg and Si so it would be obvious that at least one element such as Mg or Si and aluminum disposed on both sides of the layers as to have an excellent oxidation and corrosion resistance.

Art Unit: 1793

**As per Claim 4**, Since Asanuma teaches positive electrode collector comprising of aluminum sheet and having plurality of layers, it would have been obvious to have plurality of island regions dispersed in the sheet and the island containing at least one element (figure 3, Col.21 lines 3-6).

**As per Claims 7-8**, Asanuma teaches electrically conductive particles to be included in auxiliary layer may be used in amount of preferably 2.5 wt% to 96 wt% which includes metals, metal oxides, metal fibers, carbon black and graphite. Examples of metal oxides are  $\text{Al}_2\text{O}_3$ ,  $\text{MgO}$  and  $\text{SiO}_2$  (encompasses claimed range, Col.4 lines 58-66 and Col.6 lines 21-31).

**As per Claim 9**, Asanuma mentions composition containing  $2\text{MgO} \cdot 2\text{Al}_2\text{O}_3 \cdot 5\text{SiO}_2$  or cordierite and preferably containing in amount of 2.5-96 wt% but does not expressively mention composition containing in amount of 99.5 wt% in average composition. It would have been obvious to optimize the claimed weight percent based on the preference and other requirements which have an excellent charge/discharge cycle characteristic, high density and high charge and discharge capacities as taught by Asanuma. "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. ' [W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.' *In re Aller*." Thus, this is a case of *prima-facie* obviousness, as one having ordinary skill in the art at the time the invention was made, given the general conditions

Art Unit: 1793

taught by Asanuma, would have been able to select the claimed weight percent based on preference or other requirement (see MPEP 2144.05).

**As per Claim 10**, Asanuma teaches positive electrode collector contains aluminum preferably on the surface (Col.19 lines 1-19).

**As per Claims 11-13**, Asanuma teaches in addition to material mixture layer, the electrode also containing a protective layer, an undercoating layer to be arranged on the current collector and intermediate layer to be arranged between material mixture layers and preferably these layers containing electrically conductive particles, insulating particles, binder and like (Col.5 lines 51-67, Col.6 lines 1-31, Col.8 lines 54-67 and Col.9 lines 1-5). Electrically conductive particles such as metal oxides can be used (considered oxide layer, Col.15 lines 39-41 and Col.16 lines 16-18) and binder containing polybutadiene or fluorine base coating material (considered liquid-repellent property, Col.16 lines 29-63).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SMITA PATEL whose telephone number is (571)270-5837. The examiner can normally be reached on Monday-Thursday, 8:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1793

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SP, AU1793

05/29/2009

/Melvin Curtis Mayes/  
Supervisory Patent Examiner, Art Unit 1793